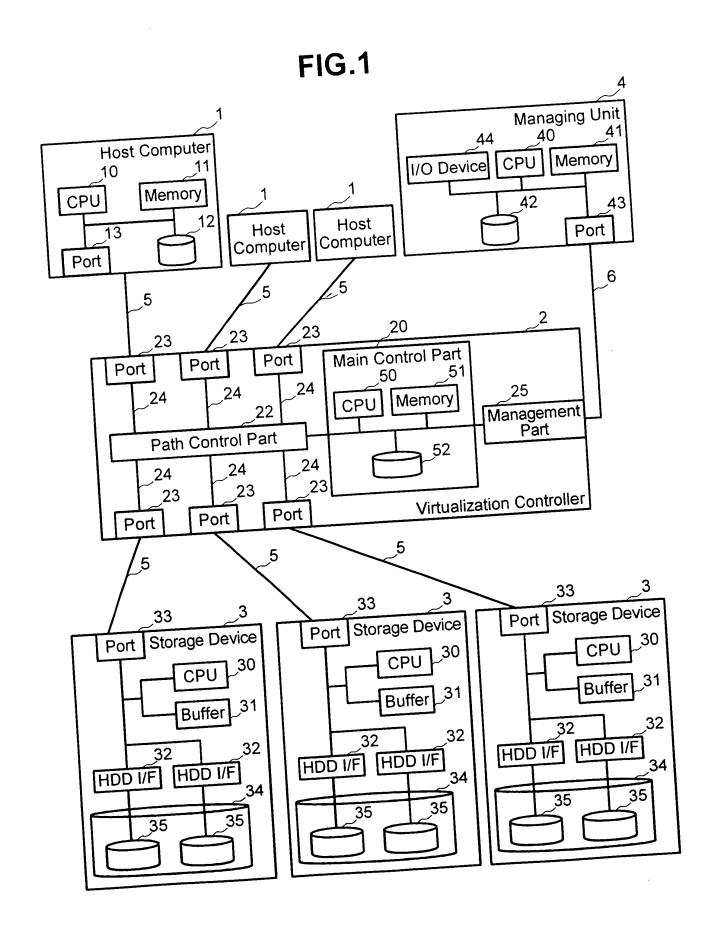
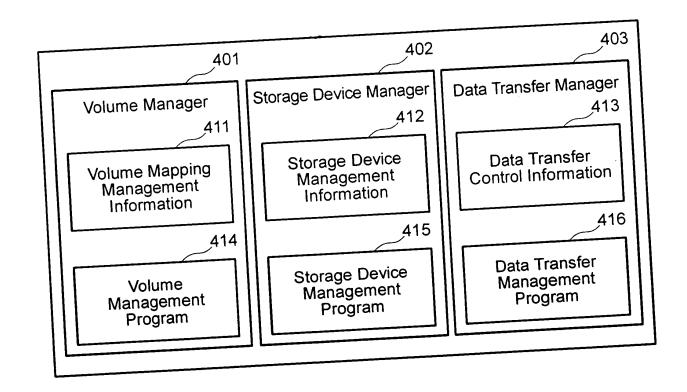
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FIG.2



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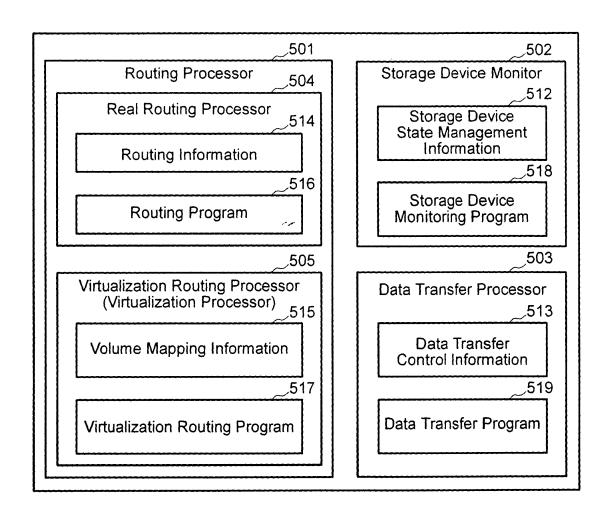


FIG.4

| 515 | ~ | 520 | | <u> </u> | | 521 | | | |
|-----------|------------|------|----------|----------|---------|-------------|------|---------|--------|
| Virtual V | olume Mana | geme | nt Infor | mation | Real Vo | olume Manag | emen | t Infom | nation |
| Port ID | Port Name | LUN | Size | Status | Port ID | Port Name | LUN | Size | Status |
| V_Pid_1 | V_Pname_1 | 0 | 10 GB | Active | P_Pid_1 | P_Pname_1 | 0 | 10 GB | Active |
| V_Pid_2 | V_Pname_2 | 0 | 5 GB | Active | P_Pid_2 | P_Pname_2 | 0 | 5 GB | Active |
| | | 1 | 5 GB | Active | P_Pid_1 | P_Pname_1 | 1 | 5 GB | Active |
| - | - | - | - | - | ~ | • | - | - | - |

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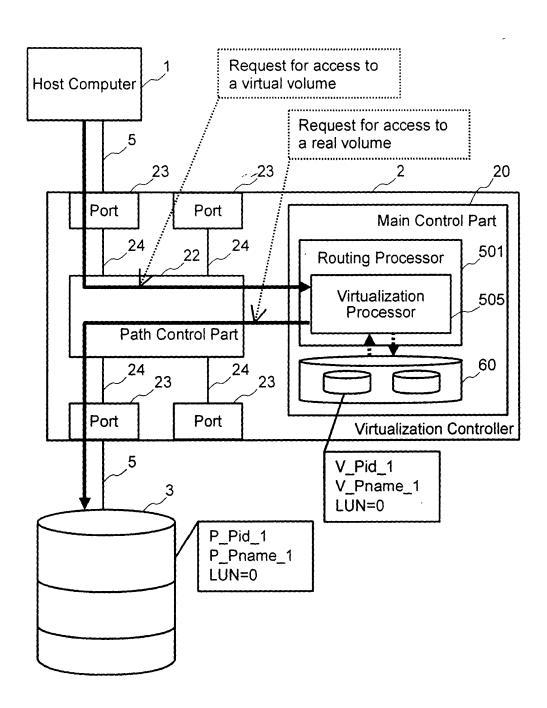
FIG.5

512

| Port ID | Port Name | Node Name | LUN | Size | |
|---------|------------|-----------|-----|-------|---|
| | P_Pname_1 | P_Nname_1 | 0 | 10 GB | |
| P_Pid_1 | 1 _1 116 | _ | 1 | 5 GB | |
| D Did 2 | P Pname 2 | P_Nname_2 | 0 | 5 GB | |
| P_Pid_2 | | P_Nname_3 | 1 | 10 GB | 1 |
| P_Pid_3 | F_FIIamo_0 | - | - | - | 1 |
| | | | | | _ |

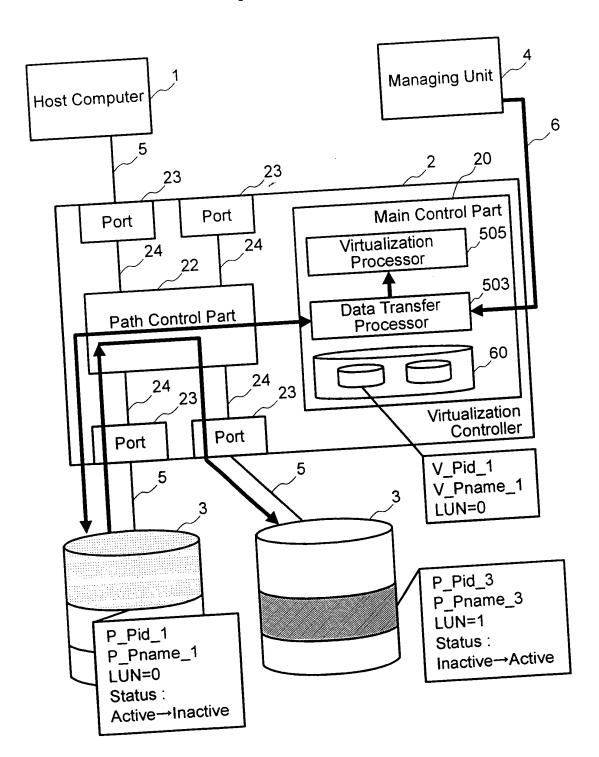
Chun-Pok Leung, Reg. No. 41,405, (650) 326-2400
Titled: Virtualization Controller and Data Transfer Control
Method
Inventor(s): Kiyoshi Honda, et al.
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FIG.6



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FIG.7

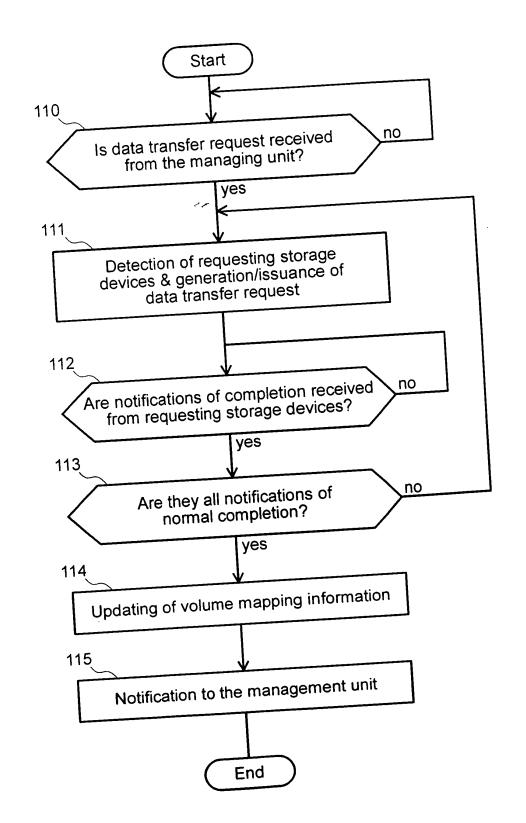


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Method
Inventor(s): Kiyoshi Honda, et al.
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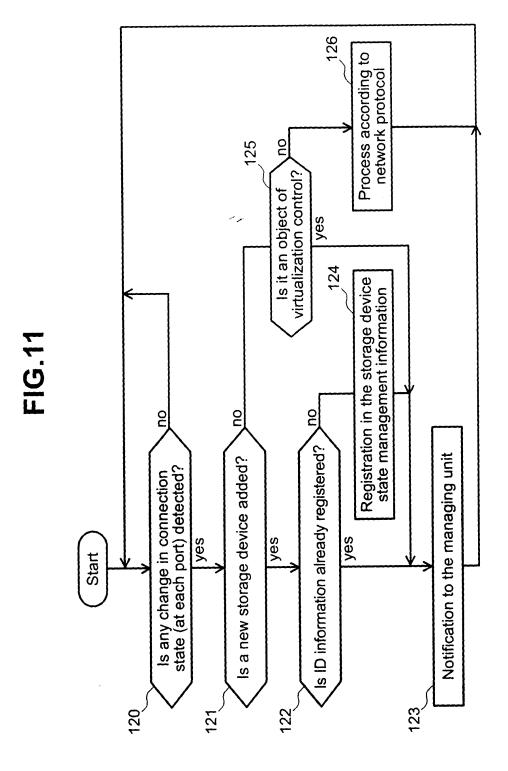
| | | Command | C_id_0 C_id_1 C_id_2 | C_id_3 C_id_4 | , | |
|-----|---------------------------------------|---------------|----------------------------|-------------------|----------|--|
| | ation | | | | | |
| | Inform | Status | Active | Active | <u>'</u> | |
| | ement | Size | 10 GB | 10 GB | | SS |
| | /lanag | LUN | 0 | ~ | , | Proce |
| 521 | Real Volume Management Information | Port Name LUN | P_Pid_1 P_pname_1 | P_Pid_3 P_Pname_3 | | Real Routing Process |
| | Ŗ | Port ID | P_Pid_1 | P_Pid_3 | , | 00 00 10 100 W |
| | ormation | Status | 10 GB Inactive | Active | - | |
| | ent Info | Size | 10 GB | 10 GB | | Start Is frame data received? Is virtualization needed? Virutualization Process |
| 520 | agen | LUN | 0 | 0 | ' | ne da la liza |
| | Virtual Volume Management Information | Port Name | V_Pid_1 V_Pname_1 0 | | • | 100 102 Is virtu |
| 515 | Virtual | Port ID | V_Pid_1 | | 1 | စ |
| | | | ∞. | | | FIG.9 |

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FIG.10



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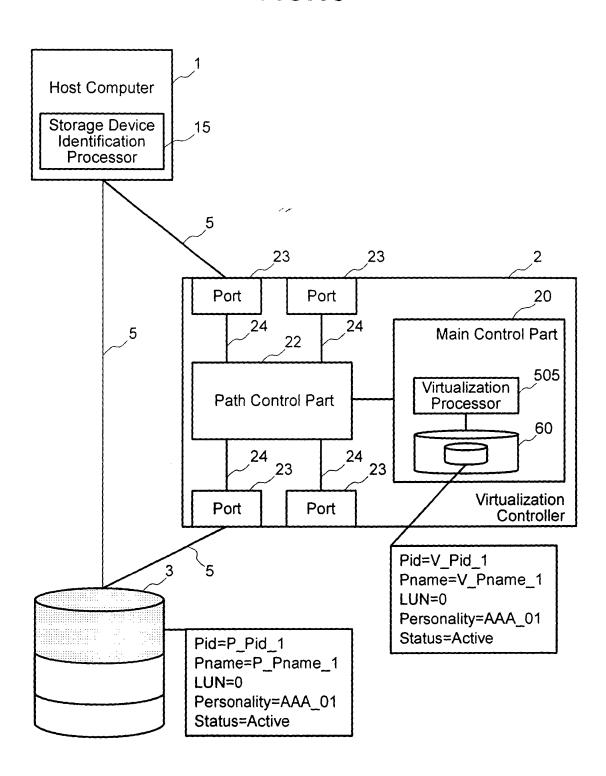


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Method
Inventor(s): Kiyoshi Honda, et al.
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| 515 | | | 52(| 0 | | | | | 521 | | | |
|---------|---------------------------------------|------|-------------|----------|----------|---------|---|-------|------------------------------------|-----------|--------|---------|
| | Virtual Volume Management Information | Mana | gement Info | ormation | _ | | Real Vol | ume N | Real Volume Management Information | nt Inform | ıation | |
| Port ID | Port ID Port Name LUN Personal | LUN | Personal | Size | Status | Port ID | Size Status Port ID Port Name LUN Personal Size Status Command | LUN | Personal | Size | Status | Command |
| V_Pid_1 | V_Pid_1 V_Pname_1 0 AAA_01 | 0 | | 10 GB | Active | P_Pid_3 | 10 GB Active P_Pid_3 P_Pname_3 0 CCC_01 10 GB Active C_id_3 | 0 | CCC_01 | 10 GB | Active | C_id_3 |
| | | 0 | 0 AAA_01 | 10 GB | Inactive | P_Pid_1 | 10 GB Inactive P_Pid_1 P_Pname_1 0 AAA_01 10 GB Active | 0 | AAA_01 | 10 GB | Active | C_id_0 |
| V_Pid_2 | V_Pid_2 V_Pname_2 0 DDD_01 | 0 | DDD_01 | 5 GB | Active | P_Pid_2 | 5 GB Active P_Pid_2 P_Pname_2 0 BBB_01 5 GB Active | 0 | BBB_01 | 5 GB | Active | • |
| | | - | AAA_00 | l | Active | P_Pid_1 | 5 GB Active P_Pid_1 P_Pname_1 1 AAA_00 5 GB Active | 1 | AAA_00 | 5 GB | Active | • |
| 1 | • | | • | , | , | ť | í | , | , | 1 | ı | |

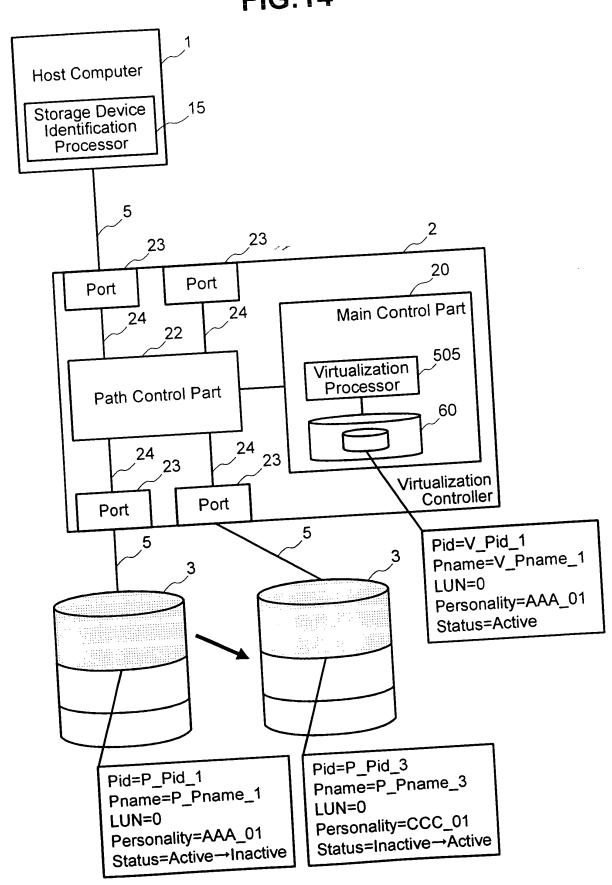
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Inventor(s): Kiyoshi Honda, et al.
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FIG.13



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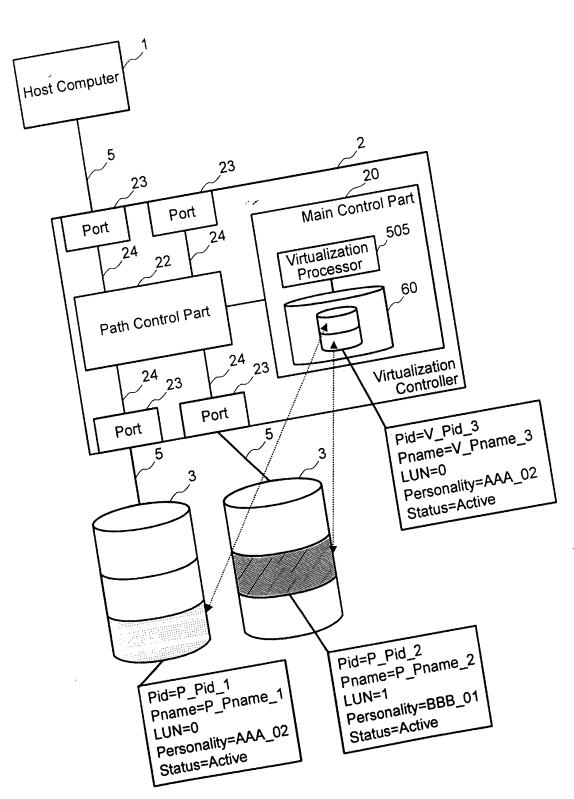
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| | | Command | C_id_6 | C_id_7 | 4 |
|-----|---------------------------------------|--|---|---|---|
| | mation | Status | Active | Active | • |
| | nt Infor | Size | 5 GB | 5 GB | - |
| 521 | Real Volume Management Information | Personal | AAA_02 | BBB_01 | 1 |
| | me M | NÀT | 3 | 1 | ſ |
| | Real Volu | Size Status Address Port ID Port Name LUN Personal Size Status Command | P_Pid_1 P_Pname_1 3 AAA_02 5 GB Active C_id_6 | 989680h ~ Pid_2 P_Pname_2 1 BBB_01 5 GB Active C_id_7 | - |
| | | Port ID | P_Pid_1 | Z_bid_q | ١ |
| | , | Address | 10 GB Active 98967Fh | 989680h ~ 1312CFFh | 1 |
| | rmatior | Status | Active | | • |
| 520 | ent Info | Size | 10 GB | | ١ |
| (| Virtual Volume Management Information | Personal | AAA_02 | | , |
| | lume | LUN | 0 | | |
| | Virtual Vo | Port ID Port Name LUN Personal | V_Pid_3 V_Pname_3 0 AAA_02 | | • |
| 515 | | Port ID | V_Pid_3 | | • |

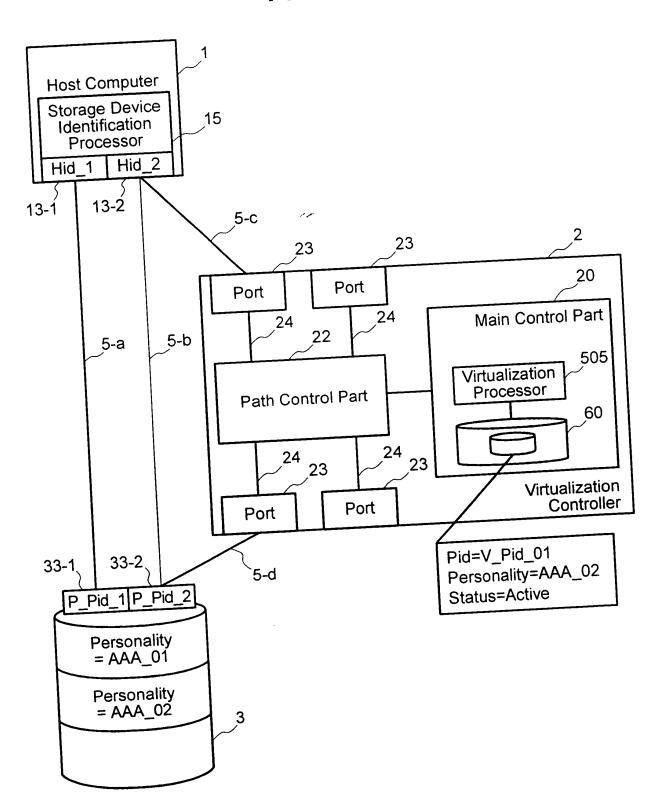
Chun-Pok Leung, Reg. No. 41,405, (650) 326-2400
Titled: Virtualization Controller and Data Transfer Control
Method
Inventor(s): Kiyoshi Honda, et al.
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FIG.17



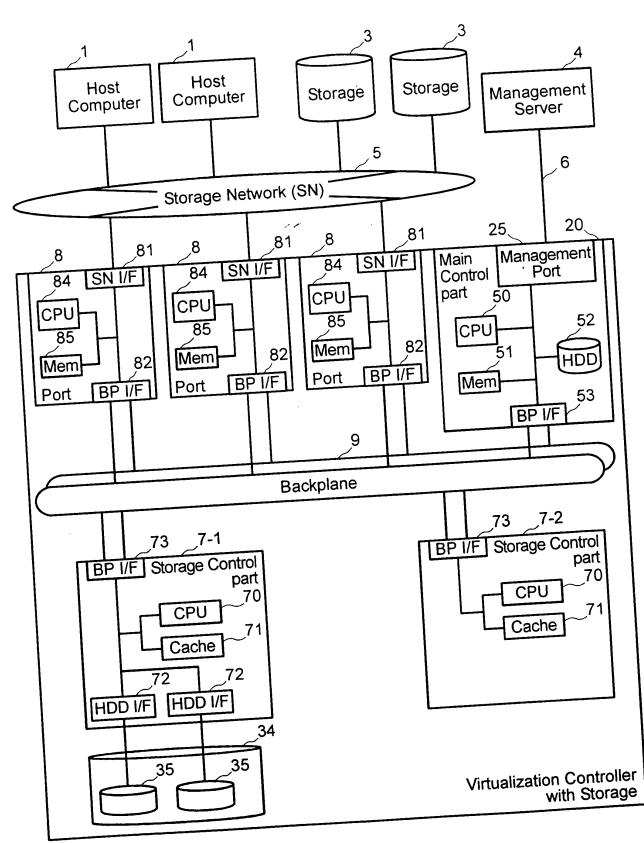
Chun-Pok Leung, Reg. No. 41,405, (650) 326-2400
Titled: Virtualization Controller and Data Transfer Control
Method
Inventor(s): Kiyoshi Honda, et al.
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FÍG.18

| Volume | Personality | Connection (P) | Connection (S) | Status |
|---------|-------------|-----------------|----------------|--------|
| Volanie | | Hid_1 - P_Pid_1 | | Active |
| | | Hid_2 - P_Pid_2 | | |
| 1 | AAA_02 | | | |

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Titled: Virtualization Controller and Data Transfer Control
Method
Inventor(s): Kiyoshi Honda, et al.

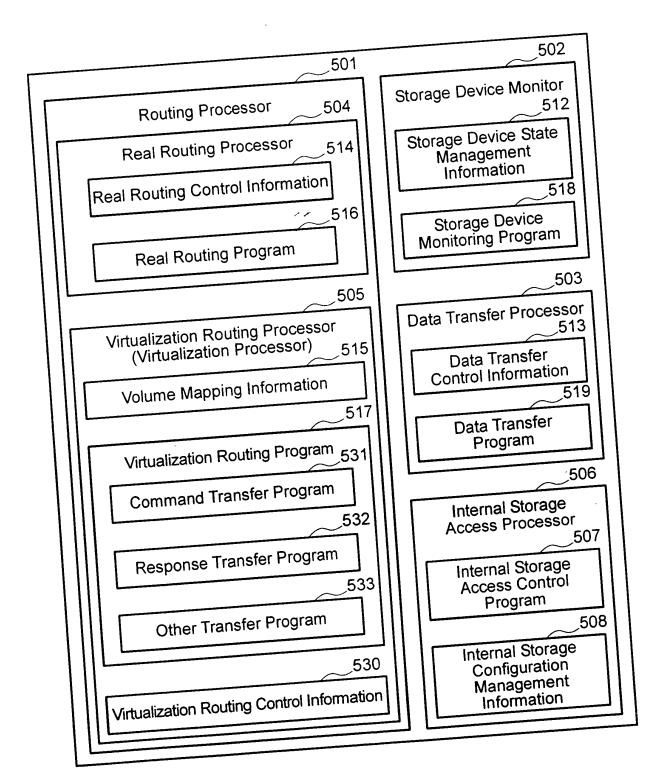
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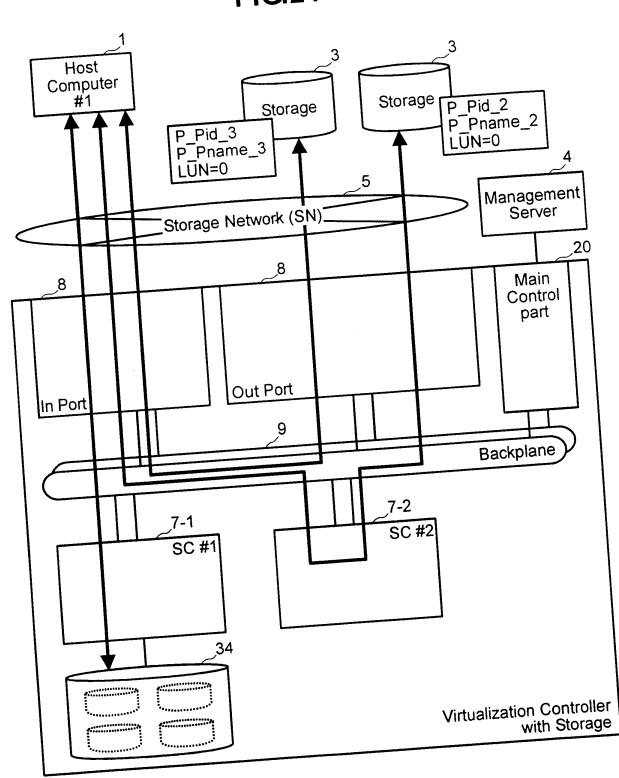
Inventor(s): Kiyoshi Honda, et al. Filed: September 15, 2003 Dckt. No. 16869P-078800US

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FIG.21



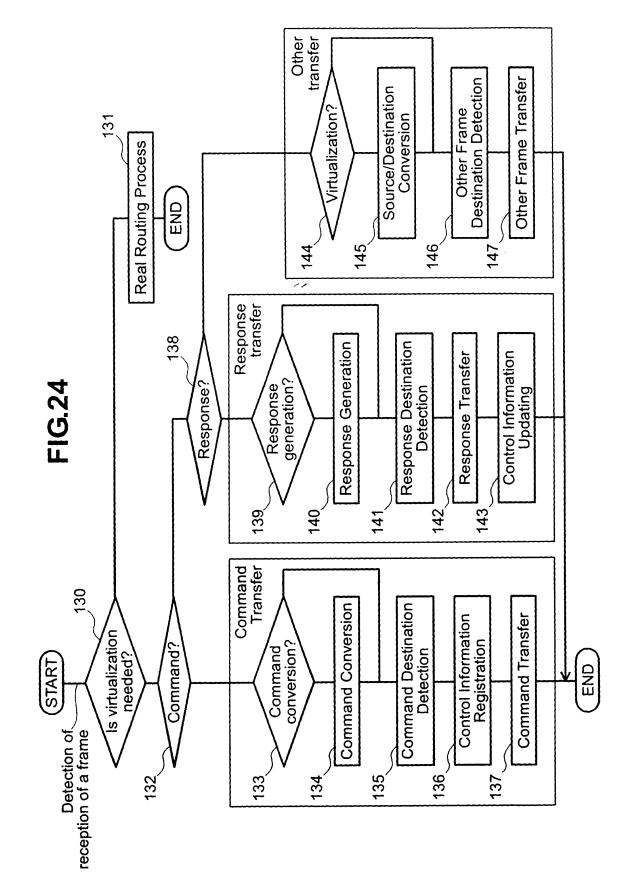
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FIG. 22

| 524 | External Volume Connection | Module ivialiagerrieri iriiorriauori | - | Out Port | Out Port | • |
|-----|--|--------------------------------------|-------------------------|---------------------------------|----------------------------------|---|
| 523 | Virtualization Module | management mornation | Storage Control part #1 | Storage Control part #2 | Out Port | • |
| 521 | tion | LUN | • | | 0 | • |
| | Real Volume Management Information | Port Name LUN | ť | 2 P_Pname_2 0 | 3 P_Pname_3 0 | • |
| | Re Manage | | • | | | • |
| 0 | ıtion | NNT | 0 | 0 | 0 | • |
| 520 | Virtual Volume Management Information | Port ID Port Name LUN Port ID | V_Pid_1 V_Pname_1 | V_Pid_2 V_Pname_2 0 P_Pid_ | V_Pid_3 V_Pname_3 0 P_Pid_ | • |
| 515 | Vir Manage | Port ID | V_Pid_1 | V_Pid_2 | V_Pid_3 | • |

| | Destination Management Information | Command Identification | InPort_Tag_1 | InPort_Tag_2 | InPort_Tag_3 | • |
|---------|------------------------------------|---|--------------|--------------|--------------|---|
| 535 | Destination Mana | Destination Identification | SC #1 | SC #2 | Out Port | • |
| 4 | Source Management Information | Source Identification Source Command Identification Destination Identification Command Identification | Host_Tag_1 | Host_Tag_2 | Host_Tag_3 | • |
| 530 534 | Source Mar | Source Identification | Host_Pid_1 | Host_Pid_1 | Host_Pid_1 | • |

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| | | | FIG.25 | | | |
|------------|---------------------------------|---------|-------------|--|------------|------------------------|
| ~515 | 520 | | | 521 | - - | 523 |
| ual Volume | Virtual Volume Management Infor | rmation | Real Volume | Information Real Volume Management Information | rmation | Virtualization Module |
| Port ID | Port Name | LUN | Port ID | Port Name | RUN | Management Information |
| V_Pid_1 | V_Pname_1 | 0 | ſ | , | • | SC #1 |
| V_Pid_2 | V_Pname_2 | 0 | 2_bid_q | P_Pname_2 | 0 | SC #2 |
| V_Pid_3 | V_Pname_3 | 0 | 6_bid_q | P_Pname_3 | 0 | Out Port |
| • | • | ٠ | • | • | • | • |
| | | | | | | |

| ~520 ~521 FIG.26 | 521 | | | 71G.20 | 7.60 | 523 | 524 |
|---|-----------------------|------------------------------------|-----------------------------|--------|------|-----------------------|----------------------------|
| Virtual Volume Real Volume Management Information | Real Volume | Real Volume Management Informat | eal Volume ment Informal | = 1 | tion | Virtualization Module | External Volume Connection |
| Port ID Port Name LUN Port ID Port Name LUN | LUN Port ID Port Name | Port ID Port Name | Port Name | | LUN | | Managerient monnation |
| V Pid 2 V Pname 2 0 P Pid 2 P Pname 2 0 | 0 P_Pid_2 P_Pname_2 | P_Pid_2 P_Pname_2 | P_Pname_2 | | 0 | SC #2 | Out Port |
| | • | • | • | | • | • | • |

| | ~~523 | Virtualization Module | LUN Management Information | SC #2 | Out Port | • |
|--------|-------|---|----------------------------|-------------------|-------------------|---|
| | 1 | rmation | LUN | 0 | 0 | • |
| /7 | 521 | nent Information Real Volume Management Information | Port Name | P_Pid_2 P_Pname_2 | P_Pid_3 P_Pname_3 | • |
| FIG.Z/ | | Real Volume | Port ID | 2_bid_q | €_biq_q | • |
| | | rmation | LUN | 0 | 0 | • |
| | 520 | Management Info | Port Name | V_Pname_2 | V_Pname_3 | • |
| | ~515 | Virtual Volume Managem | Port ID | V_Pid_2 | V_Pid_3 | • |

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| | | | | | | | [| 5 | <u> </u> | |
|-----------------|---------------------------------------|------------------------|----------|-----------|-----------|---|--------|--|------------------------------|---|
| ~ 523 | Virtualization Module | Management Information | SC #1 | Out Port | Out Port | • | 524 | External Volume Connection | Module Management Imomiation | ٠ |
| | rmation | LUN | • | 0 | 0 | • | -523 | dule | IIalloll | |
| 28 — 521 | Real Volume Management Information | Port Name | • | P_Pname_2 | P_Pname_3 | • | | Virtualization Module | ivianagement imonnation | • |
| FIG.28 | Real Volume | Port ID | ı | P_Pid_2 | P_Pid_3 | • | FIG.29 | | Port Name LUN N | · |
| | - | LUN | 0 | 0 | 0 | • | 1 | Real Volume agement Information | _ | • |
| ~520 | ent Inforn | ame | 1e_1 | 1e_2 | Je_3 | | 521 | R Manage | Port ID | |
| (| anagem | Port Name | V_Pname_ | V_Pname_2 | V_Pname_3 | ٠ | 20 | ation | LUN | · |
| [2 | Virtual Volume Management Information | Port ID | V_Pid_1 | V_Pid_2 | V_Pid_3 | • | ~ 520 | Virtual Volume Management Information | Port ID Port Name | • |
| ~515 | Virtue | Ä | > | > | > | | 515 | Virl Manage | Port ID | ٠ |

| ~ 523 | n Virtualization Module | Σ | | Out Port | • |
|--------|--|-----------|-----------|-----------|---|
| FIG.30 | rmatio | LUN | 7- | 0 | • |
| | ent Information Real Volume Management Information | Port Name | P_Pname_3 | P_Pname_3 | • |
| | Real Volume | Port ID | €_biq_q | E_bid_q | • |
| 520 | rmation | NNJ | 0 | 0 | • |
| | Management Info | Port Name | V_Pname_2 | V_Pname_3 | • |
| 515 | Virtual Volume Manageme | Port ID | V_Pid_2 | V_Pid_3 | • |